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A Taxonomic Study of the Genus *Galium* in Iowa

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A TAXONOMIC STUDY OF THE GENUS *GALIUM* IN IOWA

PHILIP JORDON LEYENDECKER, JR.

The genus *Galium*, a member of the Madder family (Rubiaceae), is world-wide in its distribution and includes approximately two hundred and fifty species. Ten species of *Galium* were enumerated by R. I. Cratty¹ in his annotated list of Iowa flora. Two new species, four varieties and three forms have since been reported for the state.

The present study of the genus was undertaken with two objects in view: first, to clarify our understanding of the species found in Iowa, many of these specimens having been incorrectly named, and second, to incorporate the several name changes since the last edition of Gray's² Manual (1908), five of which involve Iowa species.

An unusually large part of Iowa consists of cultivated land, yet the floristic unit as presented compares closely with the adjacent states, most of which have a more diversified topography. For this reason the present paper may prove useful in the adjacent states whose species closely compare with those of Iowa.

Since the floristic characters of the genus are so minute and in some cases completely absent, an attempt has been made to base the analytic key primarily on vegetative characters. Examples of such characters are number and shape of the leaves and absence or presence of pubescence on the angles of the stems.

Except for *Galium verum* and *Galium Mollugo* which may be used for ornamental purposes, none of the species treated herein have an economical value. They are variable in their habitats, growing in swamps and moist low ground, rich woods, and along rocky banks of streams.

Twelve species, four varieties, and three forms are being recognized for Iowa.

HISTORY OF THE GENUS

Linnaeus³ in 1753 described twelve species of *Galium*. Of these all were native to Europe except *G. trifidum* and *G. tinctorium* which are strictly North American. The first treatment of the

¹ Cratty, R. I. The Iowa Flora. Ia. St. Col. Jour. Sci. 7: 177-252. 1933.

² Robinson and Fernald in Gray's Man. Bot. ed. 7. 747-750. 1908.

³ Linnaeus, Sp. Pl. 105-108. 1753.

American species is that of Michaux⁴ in the Flora Boreali-Americana. From the region of the northeastern states and Canada he recognized six new species. Eleven years later, Pursh,⁵ an Englishman, who had collected and studied in this country for twelve years, presented fourteen species in his Flora Americae Septentrionalis. Seven of these are found in the geographic range of the present paper. Following Pursh's treatment De Candolle⁶ published, in the "Prodromus," all the known species of *Galium*, a total of one hundred and fifty species and their varieties. This work was by far the most comprehensive study yet undertaken. De Candolle in many cases had living material from which he took his apt descriptions. Hooker's⁷ Flora Boreali-Americana printed in 1834 was the next important treatment of the New World species. For this study he had access to a wider range of material than his predecessors, which enabled him to extend the ranges of the known species.

Within the next seven years in their Flora of North America, Torrey and Gray⁸ enumerated eighteen species and their varieties. The latter⁹ in 1848 proposed eleven species and three varieties in the first edition of his Manual eight of which are found in Iowa.

Owing to extensive exploration, especially in the western states during the latter half of the nineteenth century, Gray¹⁰ was enabled to describe fourteen new species and presented these in his Synoptical Flora of North America. His revision of the genus contained a total of thirty-seven species and their varieties.

Following the "Synoptical Flora," K. M. Wiegand¹¹ in 1897 published a paper, "*Galium trifidum* and its North American Allies." This included the descriptions of eleven species and five varieties, a synopsis of the species, together with a list of the more important specimens studied. This work is unique in that the synoptic key is based on the form that the seed presents in cross section.

The most recent contribution to the literature of the genus is an article presented by M. L. Fernald¹² in Rhodora. For the preparation of this article he had access to a photograph of the type sheet of *Galium tinctorium*. With the aid of this photograph he was able to clarify the nomenclature of *G. tinctorium*, *G. obtusum*, and *G. Claytoni*.

⁴ Michaux, Fl. Bor.-Am. 1:80. 1803.

⁵ Pursh, Fl. Am. Sept. 1: 102-105. 1814.

⁶ De Candolle, Prodr. 4: 593-613. 1830.

⁷ Hooker, J. W., Fl. Bor. Am. 1: 288-290. 1834.

⁸ Torrey and Gray, Fl. Bor. Am. 2: 19-26. 1841.

⁹ Gray, Man. Bot. ed. 1: 176-178. 1848.

¹⁰ Gray, Synop. Fl. of N. Am. 1: 35-42. 1884.

¹¹ Wiegand, K. M., Bull. Torr. Bot. Club. 24: 389-403. 1897.

¹² Fernald, M. L., Rhod. 37: 443-445, pl. 403, figs. 1 and 2. 1935.

Fernald's interpretations have been closely adhered to in the study here presented.

ACKNOWLEDGEMENTS

This study has been carried out at the Iowa State College where the library and herbarium have been placed at the writer's disposal. For these privileges and many others the author is deeply indebted to Dr. I. E. Melhus, Head of the Botany Department. He also wishes to express his deepest appreciation and thanks to Dr. G. J. Goodman, Curator of the Iowa State College Herbarium, who first suggested the problem to him, and whose invaluable assistance and helpful criticism have guided him through the course of this study. The author also wishes to express his appreciation and thanks to Dr. J. E. Sass for his assistance in the preparation of the photographs. To the following curators of herbaria, who have placed their collections at the author's disposal, he is likewise thankful: Dr. J. M. Greenman, Curator of the Herbarium of the Missouri Botanical Garden, and Dr. W. A. Anderson, Curator of the Herbarium of the University of Iowa.

The herbaria from which the material has been available for this study are as follows: Herbarium of the Missouri Botanical Garden, specimens of *G. triflorum* and *G. boreale*; Herbarium of the University of Iowa and Herbarium of Iowa State College.

TAXONOMY

GENERIC SYNONYMY AND DESCRIPTION

Galium L. Sp. Pl. 105-108. 1753; Gen. Pl. ed. 5. 46. 1754; Michaux, Fl. Bor.-Am. 1: 80. 1803; Pursh, Fl. Am. Sept. 1: 102-105. 1814; De Candolle, Prodr. 4: 593-613. 1830; Hooker, Fl. Bor.-Am. 1: 288-290. 1834; Torrey and Gray, Fl. N. Am. 2: 19-26. 1841; Gray, Man. Bot. ed. 1: 176-178. 1848; Gray, Synop. Fl. N. Am. 1²: 35-42. 1884; Bentham and Hooker, Gen. Pl. 2: 149-153. 1897; K. Schumann in Engler and Prantl, Nat. Pflanzenf. 4⁴: 149-153. 1897; Robinson and Fernald in Gray's Man. Bot. ed. 7: 747-750. 1908; Britton and Brown, Ill. Fl. ed. 2. 3: 257-266. 1913; Rydberg, Fl. Pr. and Pl. Cent. N. Am. 741-744. 1932.

Annual or perennial herbs, perennials somewhat woody at the base, stems 4-angled; leaves apparently verticillate; flowers small, perfect or in some species dioecious, borne in cymes or panicles, calyx teeth obsolete; corolla wheelshaped, valvate in bud, 4-parted or rarely 3-parted; stamens as many as lobes of the corolla and alternate them, filaments short; styles 2, united at the base; stigmata globose; ovary 2-celled, one ovule in each cell; fruit dry or fleshy, globular, twin, or 2 indehiscent glabrous or bristly hairy, carpels.

Type species: *Galium verum* L. Sp. Pl. 107. 1753.

KEY TO THE SPECIES

- A. Stems retrorsely barbed.
 - B. Leaves cuspidate pointed; corolla 4-parted.
 - C. Fruit glabrous.
 - D. Leaves linear, margins
antrorsely barbed-----1. *G. concinnum*
 - DD. Leaves oval to oblanceolate, margins
strongly retrorsely barbed-----2. *G. asprellum*
 - CC. Fruit uncinately hispid.
 - E. Leaves oblanceolate, gradually tapering into a
petiole-like base, minutely hispid above-----3. *G. Aparine*
 - EE. Leaves lanceolate to obovate, glabrous above;
flowers borne in a characteristic 3-flowered
cyme-----4a. *G. triflorum* forma *typicum*
 - BB. Leaves not cuspidate pointed; corolla 3-parted.
 - F. Leaves in 4's; pedicels minutely barbed,
reflexed in fruit-----5. *G. trifidum*
 - FF. Leaves in 5's or 6's; pedicels
stout and glabrous-----6. *G. tinctorium*
- AA. Stems not retrorsely barbed, glabrous or hairy on the angles.
 - G. Stems hairy on the angles; fruit uncinately hispid.
 - H. Leaves in 6's, cuspidate
pointed-----4b. *G. triflorum* forma *hispidum*
 - HH. Leaves in 4's, not cuspidate
pointed-----7. *G. circaezans* var. *hypomalacum*
 - GG. Stems glabrous.
 - I. Leaves in 4's.
 - J. Leaves 3-nerved; flower borne in dense panicles.
 - K. Fruit hirsute.
 - L. Fruit covered with long straight
hairs-----8a. *G. boreale* var. *typicum*
 - LL. Fruit covered with appressed incurving
hairs-----8b. *G. boreale* var. *intermedium*
 - KK. Fruit glabrous or
glabrate-----8c. *G. boreale* var. *hyssopifolium*
 - JJ. Leaves 1-nerved.
 - M. Leaves reflexed, oblong-linear,
5-13 mm. long-----9. *G. labradoricum*
 - MM. Leaves upright, lanceolate,
mostly broadest below the middle,
15-25 mm. long-----10. *G. obtusum*

II. Leaves in 6's or 8's.

N. Leaves revolute on drying,
 scabrous on upper surface;
 flowers yellow-----11. *G. verum*

NN. Leaves not as above, smooth
 on the upper surface.

O. Fruit glabrous;
 midribs glabrous-----12. *G. Mollugo*

OO. Fruit uncinately hispid;
 midribs retrorsely
 hispid-----4c. *G. triflorum* forma *glabrum*

SYNONYMY, DESCRIPTIONS AND DISTRIBUTION OF SPECIES

1. *Galium concinnum* Torrey and Gray, Fl. N. Am. 2: 23. 1841; Wiegand, Bull. Torr. Bot. Club. 24: 402. 1897; Robinson and Fernald in Gray's Man. Bot. ed. 7. 750. 1908; Britton and Brown, Ill. Fl. ed. 2. 3: 265, fig. 3949. 1913; Rydberg, Fl. of Pr. and Pl. of Cen. N. Am. 743. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, stems slender 15-35 cm. high, usually much-branched, angles minutely retrorsely hispid; leaves in 6's, linear, narrowing to the base, 1-1.5 cm. long, 2-3 mm. wide, minutely cuspidate pointed, veinless, the margins antrorsely hispid; flowers diffusely paniced; peduncles 2-3 times forked; pedicels capillary, short; corolla white, 1-1.5 mm. across, 4-parted, lobes acute or acuminate; fruit glabrous, 2mm. across.

Common name: Shining Bedstraw.

Distribution: Dry hills and woodlands, New Jersey to Virginia, west to Arkansas, Kansas and Minnesota.

Distribution in Iowa: General. (Fig. 1, Map)

2. *Galium asprellum* Michaux, Fl. Bor. Am. 1: 78. 1803; Wiegand, Bull. Torr. Bot. Club. 24: 402. 1897; Robinson and Fernald in Gray's Man. Bot. ed. 7. 750. 1908; Britton and Brown, Ill. Fl. ed. 2. 3: 265, fig. 3950. 1913; Rydberg, Fl. of Pr. and Pl. of Cen. N. Am. 743. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, stems diffusely branched forming tangled masses, angles strongly retrorsely hispid; leaves in whorls of 5's or 6's, ovate to oblanceolate, 10-12 mm. long, cuspidate pointed, sometimes appearing petiolate, margins and midribs retrorsely hispid; flowers terminal, borne in dense cymes; pedicels filiform, 2-3 mm. long; corolla white, 1.5-2 mm. across, 4-parted, lobes acute; fruit glabrous or minutely hispid, 2-2.5 mm. across.

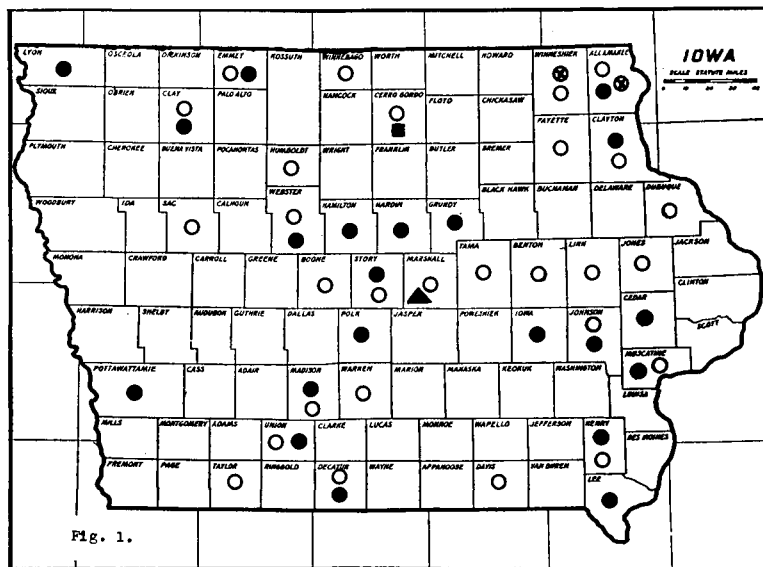
Common name: Rough Bedstraw.

Distribution: In swamps and moist soil, Newfoundland to Ontario, south to North Carolina, Nebraska, Minnesota, and Wisconsin.

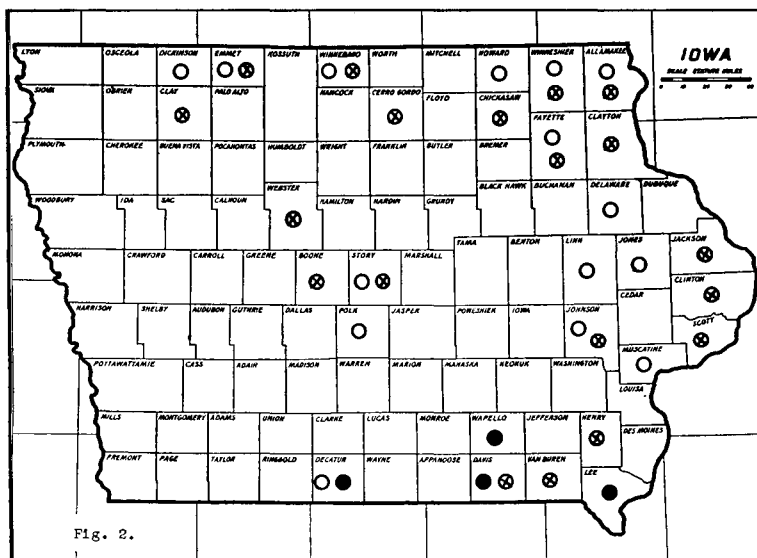
Distribution in Iowa: Northeast corner. (Fig. 1, Map)

3. *Galium Aparine* L. Sp. Pl. 108. 1753; Robinson and Fernald in Gray's Man. Bot. ed. 7. 748. 1908; Britton and Brown, Ill. Fl. ed. 2. 3: 259, fig. 3913. 1913; Rydberg, Fl. of Pr. and Pl. of Cen. N. Am. 742. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

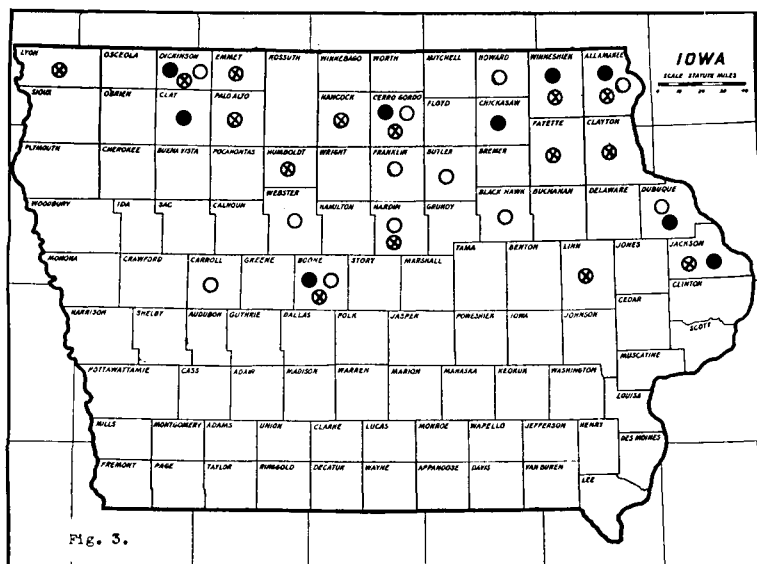
Annual with a slender tap root; stem weak, prostrate or climbing over



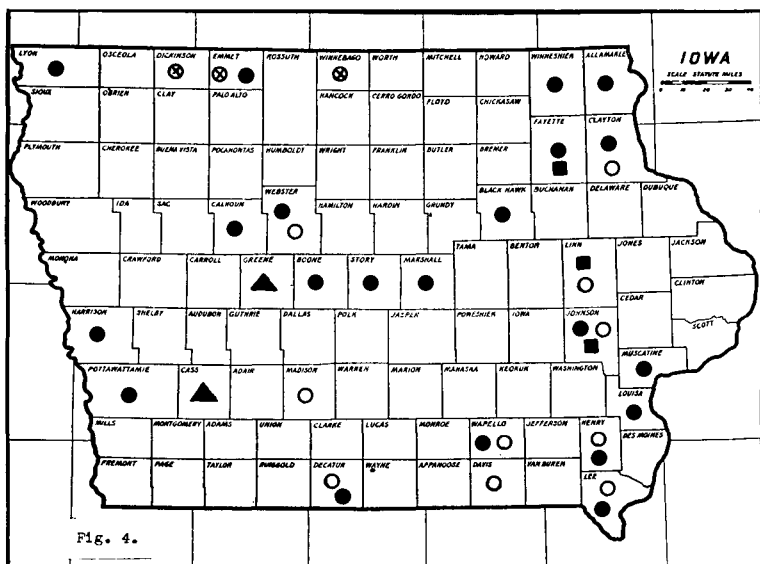
- ⊕ *G. asprellum*
 ○ *G. concinnum*
 ■ *G. labradoricum*
 ▲ *G. mollugo*
 ● *G. obtusum*



- *G. triflorum* forma *typicum*
 ⊕ *G. triflorum* forma *hispidum*
 ● *G. triflorum* forma *glabrum*



- *G. boreale* var. *typicum*
- ⊕ *G. boreale* var. *intermedium*
- *G. boreale* var. *hyssopifolium*



- *G. aparine*
- *G. circaccans* var. *hypomalacum*
- *G. tinctorium*
- ⊕ *G. trifidum*
- ▲ *G. verum*

low shrubs, 3-12 dm. high, angles retrorsely hispid, in most cases *hirsutely* hispid above the nodes; leaves in whorls of 6's or 8's, oblanceolate to linear, oblong, 3-6 cm. long, 5-8 mm. wide, cuspidate pointed; the margins and midribs retrorsely hispid, hairs on the upper surface pointing forward; flowers white, 2-3 mm. across, borne in 1-3 flowered cymes in the upper axils; fruit 4-5 mm. across, uncinately hispid.

Distribution: Various situations, New Brunswick to Florida, Texas, California, and British Columbia. Naturalized from Europe.

Distribution in Iowa: General. (Fig. 4, Map)

Galium Aparine var. *Vaillantii* (DC.) Koch.

G. Aparine var. *Vaillantii*, a slender variant with fruit 1.5-2 mm. in diameter, has been collected in Missouri. This plant probably occurs in the southern part of Iowa; however no valid collection has been reported.

4. *Galium triflorum* Michaux, Fl. Bor. Am. 1:80. 1803; Robinson and Fernald in Gray's Man. Bot. ed. 7. 750. 1908; Britton and Brown, Ill. Fl. ed. 2. 3: 262, fig. 3939. 1913; Rydberg, Fl. of Pr. and Pl. of Cen. N. Am. 743, fig. 524. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, stem diffuse or reclining, 12-40 cm. long, hispid, retrorsely barbed or glabrous on the angles; leaves 6 in a whorl, elliptical to elliptical-lanceolate, tapering at the base, 2-7 cm. long; cuspidate pointed, 1-nerved, veiny, margins and midribs scabrous; flowers terminal and axillary; peduncles mostly 3-flowered at the extremity; corolla 4-parted, greenish to greenish-white, 3-4 mm. across, lobes acute to acuminate; fruit 2-2.5 mm. across, beset with long, hispid, uncinuate hairs.

4a. *Galium triflorum* Michx. forma *typicum*.

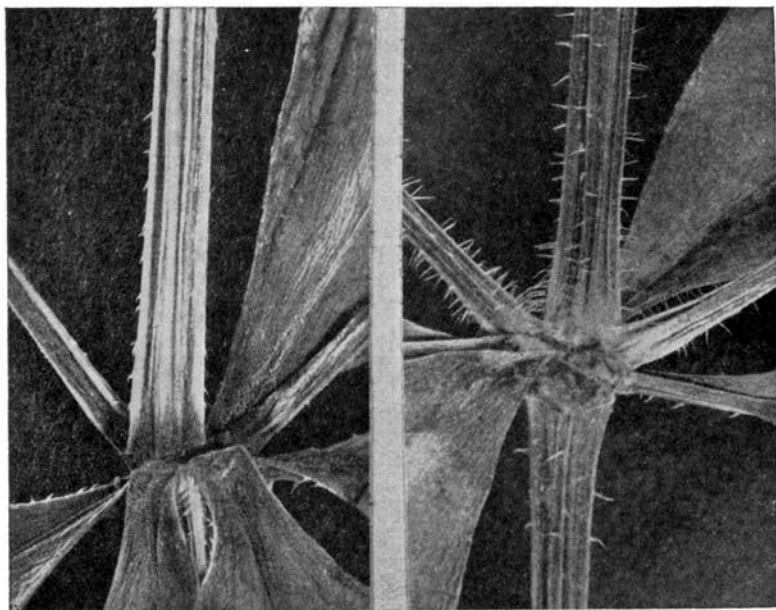


Figure 5. *G. triflorum* forma *typicum*, showing retrorse hairs. (X 6.)

Figure 6. *G. triflorum* forma *hispidum*, showing straight hairs. (X 6.)

Galium triflorum Michaux, Fl. Bor.-Am. 1:80. 1803. (Fig. 5)

Angles of the stems retrorsely barbed.

Distribution: Across the United States. New Brunswick south to Florida, New Mexico, California, Oregon, Washington, and Alaska.

Distribution in Iowa: Eastern two-thirds of State. (Fig. 2, Map)

4b. *Galium triflorum* Michx. forma *hispidum* Leyendecker, Ia. St. Col. Jour. Sci. 15, No. 2, 1941. (Fig. 6)

Angles of the stems beset with straight hairs. Otherwise as the species.

Type: Ledges State Park, Boone Co., Iowa, July 25, 1903, L. H. Pammel, R. E. Buchanan and C. M. King 3949 (Herbarium of Iowa State College).

Distribution: New Brunswick south to North Carolina, Missouri, New Mexico, California, Washington, Oregon, and Alaska.

Distribution in Iowa: Eastern two-thirds of State. (Fig. 2, Map)

4c. *Galium triflorum* Michx. forma *glabrum* Leyendecker, Ia. St. Col. Jour. Sci. 15, No. 2, 1941. (Fig. 7)

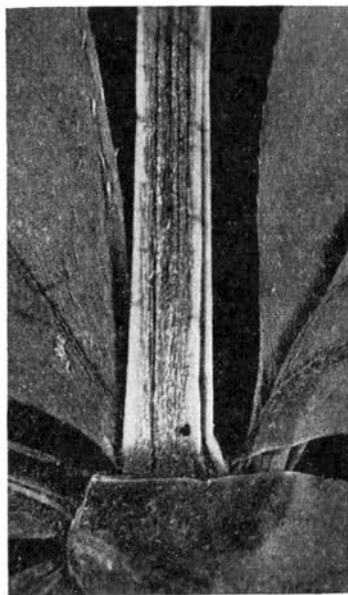


Figure 7. *G. triflorum* forma *glabrum*, showing smooth angles of the stem. (X 6.)

Angles of the stems glabrous. Otherwise as the species.

Type: Webb City, Jasper Co., Missouri. July 23, 1910, B. F. Bush 6029 (Herbarium of the Missouri Botanical Garden).

Distribution: Quebec south to Virginia, Arkansas, Iowa, Minnesota; also on the Pacific slope in California, Washington, and British Columbia.

Distribution in Iowa: Southcentral, extending eastward. (Fig. 2, Map)

5. *Galium trifidum* L. Sp. Pl. 105. 1753; Wiegand, Bull. Torr. Bot. Club. 24: 399. 1897; Robinson and Fernald in Gray's Man. Bot. ed. 7. 749. fig. 907. 1908; Britton and Brown, Ill. Fl. ed. 2. 3:264, fig. 3946. 1913; Rydberg, Fl.

of Pr. and Pl. of Cen. N. Am. 743. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, stems decumbent to ascending, much branched and intertwined; stems 4-angled, angles retrorsely roughened; leaves in 4's, linear to linear-spatulate, 4-10 mm. long, margins and midribs retrorsely scabrous; flowers terminal or lateral, borne in 1-3-flowered cymes; pedicels filiform, 7-10 mm. long, reflexed in fruit, both peduncles and pedicels retrorsely scabrous on the angles; corolla small, 1 mm. across, 3-parted, lobes obtuse; fruit glabrous, 1.5-2.5 mm. across.

Common name: Small Bedstraw.

Distribution: Sphagnous bogs and swamps, Labrador, Newfoundland to New York, Ohio, Nebraska, and Colorado.

Distribution in Iowa: North Central. (Fig. 4, Map)

6. *Galium tinctorium* L. Sp. Pl. 106. 1753; Fernald, Rhod. 37: 443-445, Pl. 403, figs. 1 and 2. 1935; *G. Claytoni* Michaux, Fl. Bor.-Am. 1: 78. 1803; Wiegand, Bull. Torr. Bot. Club. 24: 400. 1897; Robinson and Fernald in Gray's Man. Bot. ed. 7. 750, fig. 908. 1908; Britton and Brown, Ill. Fl. ed. 2. 3: 264, fig. 3947. 1913; Rydberg, Fl. of Pr. and Pl. of Cen. N. Am. 743. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, stems erect or ascending, stems 4-angled, retrorsely hispid or roughened, branching dichotomously, leaves 5-10 mm. long, 2-3 mm. wide, commonly in 4's or 5's, secondary branches mostly bearing 4 at a node, linear to linear-spatulate, base in some cases narrowing into a short petiole, margins and midribs scabrous; flowers terminal or axillary, borne mostly in 3-flowered cymes; pedicels short, 3-3.5 mm. long, not exceeding the leaves, glabrous, strongly reflexed in fruit; corolla white, 3-parted, 1-1.5 mm. across, lobes obtuse; fruit glabrous, 2 mm. across.

Distribution: Swamps and marshes, Quebec to New York, south to North Carolina, Texas, Missouri, Nebraska, and Michigan.

Distribution in Iowa: East central. (Fig. 4, Map)

7. *Galium circaezans* Michx. var. *hypomalacum* Fern., Rhod. 39: 450, pl. 483, figs. 3 and 4. 1937; *G. circaezans* Michx. Robinson and Fernald in Gray's Man. Bot. ed. 7. 749. 1908; Britton and Brown, Ill. Fl. ed. 2. 3: 261, fig. 3936. 1913; Rydberg, Fl. of Pr. and Pl. Cen. N. Am. 742. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, stems upright or ascending, angles smooth or puberulent, leaves in 4's, oval to ovate, 1.5-4.5 cm. long, 1-2.5 cm. broad, 3-nerved, these conspicuously long, hirsute beneath, margins ciliate; cymes lateral or terminal, peduncle once forked, spreading or in fruit reflexed; flowers sessile or on extremely short lateral pedicels; corolla greenish, 1-2.5 mm. across, 4-parted, lobes acute or acuminate, hairy without; fruit 2.5-3 mm. broad, armed with long hooked hairs.

Common name: Wild Liquorice.

Distribution: Dry woods, Quebec south to North Carolina, Kentucky, Missouri, Oklahoma, Nebraska, and Minnesota.

Distribution in Iowa: Eastern half. (Fig. 4, Map)

8. *Galium boreale* L. Sp. Pl. 108. 1753; Robinson and Fernald in Gray's Man. Bot. ed. 7. 749. 1908; Britton and Brown, Ill. Fl. ed. 2. 3: 261. fig. 3938. 1913; Rydberg, Fl. Pr. and Pl. Cen. N. Am. 742. 1932.

Perennial, stems erect, 20-60 cm. high, smooth to sparingly hirsute on the angles, nodes hairy; leaves in 4's, linear to broadly lanceolate, 1.5-3.5 cm.

long, distinctly 3-nerved, margins ciliate and slightly revolute, nerves sometimes ciliate; flowers terminal, borne in densely, many flowered, pyramidal panicles; corolla 4-parted, white, 2.5-3 mm. across, lobes acute; fruit hirsute to glabrous.

Common name: Northern Bedstraw.

8a. *Galium boreale* L. var. *typicum*; *G. boreale* L. Sp. Pl. 108. 1753; *G. boreale* L. var. *typicum* Beck von Man. Pl. Nied.-Öst. ii. 1121. 1893; *G. boreale* L. var. *scabrum* DC. Prodr. 601. 1830; Fernald, Rhod. 30: 106-107. 1928. (Fig. 8)

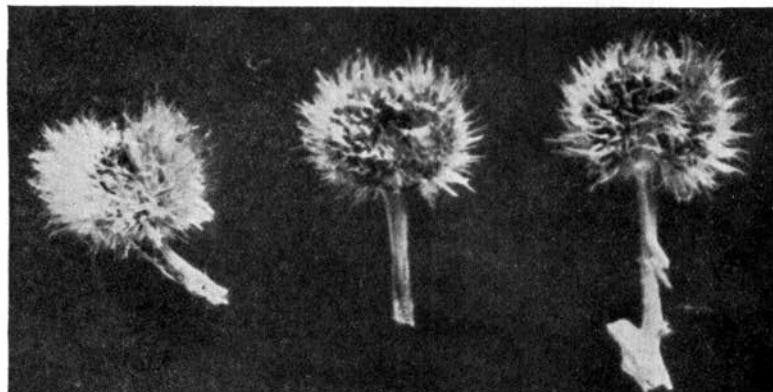


Figure 8. Fruits of *G. boreale* var. *typicum*, showing long, straight hairs. (X 10.)

Fruit villous-hirsute with long straight hairs. Otherwise as the species.

Distribution: Manitoba to Michigan, Minnesota south to New Mexico, Oregon, Washington, British Columbia, and Alaska.

Distribution in Iowa: Central, extending north and east. (Fig. 3, Map)

8b. *Galium boreale* L. var. *intermedium* DC. Prodr. 601. 1830; Fernald, Rhod. 30: 106-107. 1928. (Fig. 9)

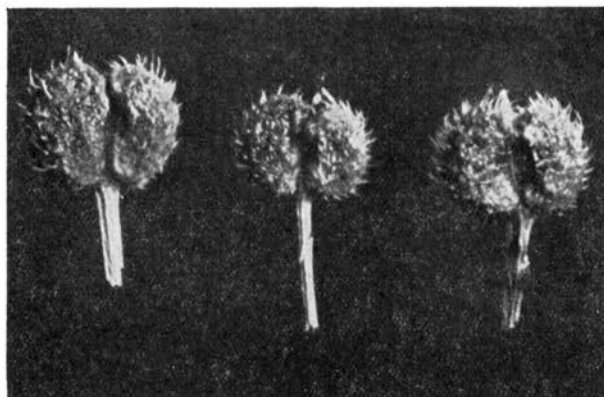


Figure 9. Fruits of *G. boreale* var. *intermedium*, showing short, incurved hairs. (X 10.)

Fruit covered with short appressed or incurving hairs. Otherwise as the species.

Distribution: Across the continent.

Distribution in Iowa: Central, extending eastward. (Fig. 3, Map)

8c. *Galium boreale* L. var. *hyssopifolium* (Hoffm.) DC. Prodr. IV 600. 1830; Fernald, Rhod. 30: 106-107. 1928. (Fig. 10)

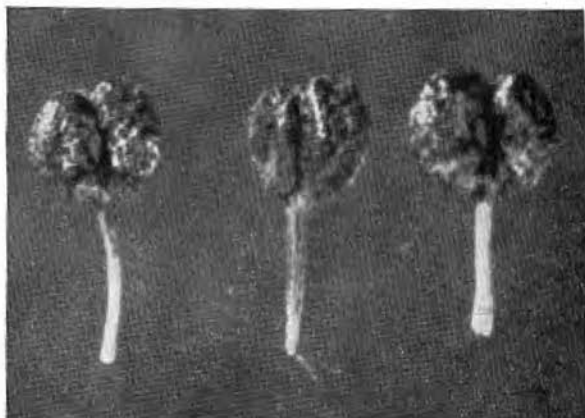


Figure 10. Fruits of *G. boreale* var. *hyssopifolium*, showing glabrous surfaces. (X 10.)

Fruit glabrous or glabrate. Otherwise as the species.

Distribution: Gaspé Peninsula, across southern Quebec south to New York, Illinois, Missouri, and North Dakota; also on the Pacific slope in Oregon, Washington, and Vancouver Island.

Distribution in Iowa: Central, extending eastward. (Fig. 3, Map)

9. *Galium labradoricum* Wiegand, Rhod. 6:21. 1904; Robinson and Fernald in Gray's Man. Bot. ed. 7. 750. fig. 910. 1908; Britton and Brown, Ill. Fl. ed. 2. 3:264, fig. 3945. 1913; Rydberg, Fl. of Pr. and Pl. of Cen. N. Am. 743. 1932; *Galium tinctorium* var. *labradoricum* Wiegand, Bull. Torr. Bot. Club. 24: 398. 1897.

Perennial, stems slender, erect or ascending, 10-40 cm. high, smooth on the angles; leaves in 4's, usually reflexed, 4-12 mm. long, glabrous; flowers few, in groups of 2-5, on stout peduncles; pedicels short, glabrous, 1-2 mm. long, mostly reflexed in fruit; corolla 4-parted, 2-3.5 mm. across, white lobes acute; fruit glabrous, usually but one carpel developing, 1-1.5 mm. across.

Common name: Labrador Marsh Bedstraw.

Distribution: Bogs and swamps, Labrador, Newfoundland to Massachusetts, Connecticut, New York, and Minnesota.

Distribution in Iowa: Cerro Gordo Co. (Fig. 1, Map)

The single specimen labeled *G. labradoricum* in the Iowa State University Herbarium has been closely examined and without a doubt is correctly named. *G. labradoricum* has been reported from Minnesota; therefore it is probable that extensive collecting in the north central part of Iowa would establish other stations for this plant.

10. *Galium obtusum* Bigelow, Fl. Bost. ed. 2. 35. 1824; Fernald, Rhod. 37: 443-445, Pl. 403, fig. 3. 1935; *G. tinctorium* of authors not of L.; Wiegand, Bull. Torr. Bot. Club. 24: 396. 1897; Robinson and Fernald in Gray's Man. Bot. ed. 7. 750, fig. 3944. 1913; Rydberg, Fl. of Pr. and Pl. of Cen. N. Am. 743. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, stems erect, rather stiff, 15-45 cm. tall, freely branched from near the base, smooth, 4-angled; leaves commonly in 4's, linear to lanceolate, 1-2 cm. long, in most cases broadest below the middle, 1-nerved, margins and midribs minutely hispid; flowers terminal; corolla 4-parted, white, 2.5-3 mm. across, lobes oblong, acute; fruit glabrous, 2.5-3.5 mm. broad.

Common name: Stiff Marsh Bedstraw.

Distribution: Damp places, meadows and swamps; Quebec, to North Carolina, Florida, Texas, Arizona, and Michigan.

Distribution in Iowa: General. (Fig. 1, Map)

11. *Galium verum* L. Sp. Pl. 107. 1753; Robinson and Fernald in Gray's Man. Bot. ed. 7. 748. 1908; Britton and Brown, Ill. Fl. ed. 2. 3:258, fig. 3928. 1913; Rydberg, Fl. of Pr. and Pl. of Cen. N. Am. 744. 1932; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, erect, branching from a somewhat woody base, stems 4-angled, smooth or minutely scabrous on the angles; leaves in 6's or 8's, narrowly linear, soon reflexed, 1-3 cm. long, 2 mm. wide, acuminate tipped, scabrous on upper surface, margins revolute on drying; flowers terminal, crowded into a dense narrow panicle, lower branches longer than the internodes; pedicels short, 1-2 mm. long; corolla yellow, 2-3 mm. across, lobes linear, acute; fruit glabrous, 1-1.5 mm. across.

Common name: Yellow Bedstraw.

Distribution: Fields, Maine to Massachusetts, New York, Pennsylvania, and North Dakota. Naturalized from Eurasia.

Distribution in Iowa: Southwest. (Fig. 4, Map)

G. verum is infrequent and has probably escaped from cultivation.

12. *Galium Mollugo* L. Sp. Pl. 107. 1753; Robinson and Fernald in Gray's Man. Bot. ed. 7. 749. 1908; Britton and Brown, Ill. Fl. ed. 2. 3:263, fig. 3942. 1913; Conard, Fl. of Iowa, ed. 5. 53. 1939.

Perennial, stems erect or diffusely branched, smooth on the angles; leaves 6-8 at the node, linear to oblanceolate, 1-3 cm. long, cuspidate pointed, margins minutely roughened; flowers terminal, borne in an elongated many flowered panicle; pedicels filiform; corolla white, 4-parted, 2-3 mm. across, lobes acute; fruit glabrous, 1-2 mm. across.

Common name: Wild Madder.

Distribution: Fields and waste places, Newfoundland to Vermont, south to Virginia, Ohio, and North Dakota. Naturalized from Europe.

Distribution in Iowa: Marshall Co. (Fig. 1, Map)

The single specimen in the Herbarium of Iowa State College is believed to be a cultivated plant sent in for identification.

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